
Available Days Per Month

Total Days Per Year 260 *number of working days in a year*

Unavailable Days per year

Vacation	8
Floating Days	2
Holidays	8
Continuing Training	19
Personal Days	4
Sick Days	2
Total unavailable days per year	43

Total Available Days Per Year 217

Total Available Days Per Month 18.08

This data was 1998 Planning Data provided to C&L by SBC

Manual Resale Service Order Processing Time

Resale Service Category

		RESIDENTIAL		BASIC BUSINESS		COMPLEX	
Service Order Type		<u># of Obs.</u>	<u>Average Minutes per Service Order</u>	<u># of Obs.</u>	<u>Average Minutes per Service Order</u>	<u># of Obs.</u>	<u>Average Minutes per Service Order</u>
	NEW	331	5.96	16	13.44	-	-
	CHANGE	207	3.37	3	7.00	-	-
	CONVERSION	31	11.10	39	18.67	24	9.50
	DISCONNECT	141	3.48	11	5.00	-	-
	RECORD/CSR	17	1.76	-	-	2	6.50
	F&T	42	6.36	-	-	-	-
	OTHER	9	6.33	-	-	-	-
OVERALL		778	5.02	69	14.77	26	9.27

Headcount adjustment for non-AT&T CLEC orders that fall out of the electronic ordering process (does not include AT&T because there are 100 positions dedicated to that account):

Total December 1997 AT&T posted electronic orders	45,458
Total December 1997 AT&T FTE's that worked on fall out	47
Ratio of electronic orders to re-work reps	~1 to 1,000

Manual UNE Service Order Processing Time

UNE Time Study Statistics	
# of Test LSRs	29 LSRs
# of Service Orders Observed	87
<u>Processing Time</u>	
Average Minutes per Service Order	17.7 minutes
Average Minutes per Service Order (Weighted by service order distribution of projected UNE order types)	19.2 minutes

Capacity Planning Checklist used as Criteria for Evaluating OSS Applications

1. RESOURCES

1.1. Personnel

- 1.1.1. Is capacity planning a stated function of the firm's Information Technology (IT) role?
- 1.1.2. Are specific roles and responsibilities of the capacity planning function defined?
- 1.1.3. Is the capacity planning function staffed with personnel explicitly charged with its execution?

1.2. Financial

- 1.2.1. Is the capacity planning function a component of the organization's budget or other financial allocation plan?
- 1.2.2. Does a mechanism exist whereby financial resources required for the capacity planning function, in excess of any previously allocated amounts, may be requested and obtained?

2. PLANNING

2.1. Performance Measurement

- 2.1.1. Does the capacity planning function specify measures that must be obtained of the organization's information infrastructure?
- 2.1.2. Does a schedule exist for obtaining the measures specified by the capacity planning function?
- 2.1.3. Does the capacity planning function specify tools to be employed for obtaining the desired measures?

2.2. Demand Forecasting

- 2.2.1. Are forecasts of demand volumes obtained from a source other than the capacity planning function itself?
- 2.2.2. Are demand forecasts obtained in a controlled manner consistent with the objective and schedule of the capacity planning function?
- 2.2.3. Do demand forecasts include allocations for new systems implementations and associated demand, in addition to increased demand expectations for existing systems?

2.3. Planning

- 2.3.1. Are demand forecasts compared to current capacity measures and capacity expansion plans to determine potential future constraints?
- 2.3.2. Do demand vs. capacity projections provide notification of expected capacity constraints in excess of the time required to plan for capacity expansion in budgets or other financial allocation plans?

Capacity Planning Checklist used as Criteria for Evaluating OSS Applications

3. RESOURCE ALLOCATION

3.1. Purchasing

- 3.1.1. Does the capacity planning function specify a process of converting known capacity constraints into firm hardware requirements?
- 3.1.2. Does the capacity planning function specify procedures for analyzing and acquiring hardware?

3.2. Testing

- 3.2.1. Does the capacity planning function specify tests that must be conducted on newly acquired hardware to determine operational readiness?
- 3.2.2. Are operational readiness tests conducted in a planned and controlled manner ?
- 3.2.3. Do operational readiness tests emphasize testing user requirements, as well as integration to existing systems?

3.3. Implementation

- 3.3.1. Does the capacity planning function specify a formal process for notifying impacted users of a systems change or update, and provide a mechanism for immediate user feedback?
- 3.3.2. Does the capacity planning function ensure that appropriate personnel are allocated to a systems roll-out effort to manage unplanned contingencies and minimize business impact?
- 3.3.3. Are specific system controls tied to user requirements identified and monitored to determine hardware operation in the production environment?

Note: Depending on the environment, these activities may be under the control of users rather than traditional (e.g., IBM mainframe environment) computer operators.

Computer Operations		
Control Objective	What control procedures address the control objective?	w/p ref*
3.1 Batch processes Batch processes that must be run at specific times (e.g., daily, weekly, month end, year end) should be documented, scheduled, and maintained on an ongoing basis. <i>Consider, for example, the following points of focus:</i> <ul style="list-style-type: none"> • What ensures appropriate planning of batch processes? • What ensures that all changes to batch processes are appropriate and authorized? • What ensures that departures from pre-approved schedules are identified and approved? • What ensures that data required for a batch process are available (e.g., transmissions from other locations are received prior to beginning the batch process)? • Is the operation of batch processes appropriately documented? 		
3.2 Backup Up-to-date backups of programs and data should be available in emergencies. <i>Consider, for example, the following points of focus:</i> <ul style="list-style-type: none"> • Are backup procedures appropriate for: <ul style="list-style-type: none"> - Data - Programs? • Are backups stored in a secure location? • What ensures that backup and recovery procedures will work when required? 		
3.3 Recovery from operational failures There should be appropriate procedures to ensure that operational failures (e.g., disk drive problems, program abends, other emergencies) are identified, resolved in a timely manner, and, where appropriate, approved retrospectively by appropriate IT staff and users. <i>Consider, for example, the following points of focus:</i> <ul style="list-style-type: none"> • Are there appropriate escalation procedures in place to resolve operational failures in a timely manner? 		

Computer Operations		
Control Objective	What control procedures address the control objective?	w/p ref*
<ul style="list-style-type: none"> • <i>Are appropriate IT staff and, where appropriate, users involved in the resolution of operational failures?</i> • <i>Is there appropriate reporting of operational failures?</i> • <i>How is the point of failure identified?</i> • <i>What ensures that the underlying causes of operational failures are identified and addressed (as opposed to applying short-term fixes)?</i> 		
<p>4.7 Network services</p> <p>The network hardware and software should be appropriately designed and implemented to achieve availability, performance and resilience requirements.</p> <p><i>Consider, for example, the following points of focus:</i></p> <ul style="list-style-type: none"> • <i>How are changes to the network and software approved, controlled and tested?</i> • <i>What ensures that the network configuration is appropriate for the computer hardware, operating environment and performance levels?</i> • <i>What measures are in place to prevent operational failure?</i> • <i>What processes are in place for capacity planning?</i> • <i>How are network points of failure identified?</i> • <i>What ensures that the underlying causes of network failures are identified and addressed (as opposed to short term fixes)?</i> • <i>What network documentation is available?</i> 		

Section VI

Scalability

Forecast of Service Orders for 1998 based on SWBT Line Forecast

	Map	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Totals
Resale	a	103,333	103,333	103,333	103,333	103,333	103,333	103,333	103,333	103,333	103,333	103,333	103,337	1,240,000
Manual %	b	61%	60%	59%	58%	57%	56%	55%	54%	53%	52%	51%	50%	
Electronic %	c	39%	40%	41%	42%	43%	44%	45%	46%	47%	48%	49%	50%	
Manual Orders	a x b = m	63,033	62,000	60,966	59,933	58,900	57,866	56,833	55,800	54,766	53,733	52,700	51,669	688,200
Electronic Orders	a x c = e	40,300	41,333	42,367	43,400	44,433	45,467	46,500	47,533	48,567	49,600	50,633	51,669	551,800
UNE Orders	u	50,000	50,000	50,000	50,000	50,000	50,000	50,000	50,000	50,000	50,000	50,000	50,000	600,000
Total Orders:	a + u = t	153,333	153,333	153,333	153,333	153,333	153,333	153,333	153,333	153,333	153,333	153,333	153,337	1,840,000
Manual	m+u = f	113,033	112,000	110,966	109,933	108,900	107,866	106,833	105,800	104,766	103,733	102,700	101,669	1,288,200
Electronic	e	40,300	41,333	42,367	43,400	44,433	45,467	46,500	47,533	48,567	49,600	50,633	51,669	551,800

Assumptions:

- 1997 total resale orders were 730,847 / 244,500 CLEC resale lines = 3 orders per line
- 103,333 resale orders/month = 413,500 lines forecast 1998 x 3 orders per line / 12 months
- SWBT forecasts electronic orders to grow from 37% in 12/97 to 50% by 12/98
- 1997 experience shows that 1 rep per 1,000 electronic orders must be dedicated to electronic order fallout and re-work
- 50,000 UNE orders/month = 200,000 line forecast for 1998 x 3 orders per UNE (C&L study) / 12 months
- SWBT forecasts processing all UNE manually through 1998

December 1997 Actual LSC Headcount and Planned 1998 LSC Headcount

	Actual	Planned 1998 LSC Headcount											
	Dec '97	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
Total Service Representatives	559	550	606	606	606	672	672	672	745	745	745	745	745
ATT Dedicated Representatives	100	100	100	100	100	100	100	100	100	100	100	100	100
Other Re-work Representatives	38	40	41	42	43	44	45	46	48	49	50	51	52
Billing Dedicated Representatives													
Available Order Representatives	421	410	465	464	463	528	527	526	597	596	595	594	593

December 1997 Manual Capacity Computations

	Formula	Dec '97
Total Service Representatives	a	559
ATT Dedicated Representatives	b	100
Other Re-work Representatives	c	38
Billing Dedicated Representatives		
Available Order Representatives	a-b-c=d	421
Minutes/day/representative	e	450
Non-productive time (minutes)	f	85.5
Productive minutes/day/representative	e-f=g	364.5
Total Productive minutes/day	d x g = t	153,456
Order times (in minutes)		
Residential Resale	h	5.02
Small Business Resale	i	14.77
Complex Business Resale	j	25
UNE	k	19.2
Channel Mix		
Residential Resale	l	82%
Small Business Resale	m	17%
Complex Business Resale	n	0%
UNE	o	1%
		100%
Weighted Average times		
Residential Resale	h x l	4.1164
Small Business Resale	i x m	2.5109
Complex Business Resale	j x n	0
UNE	k x o	0.192
Weighted Avg min/order	sum = p	6.8193
Order Capacity/Day	t / p = q	22,503
Days/Month	r	18.08
Order Capacity/Month	q x r = s	406,854
December '97 Orders		83,543
Spare Order Capacity/Month		323,311
Available UNE Order Capacity		114,831

Dec '97 Actuals		
	Orders	% Total
Manual	83,543	63%
Residence	70,176	
Business	13,367	
Electronic	49,122	37%
Total	132,665	100%

Assumptions:

- ATT representatives work solely on ATT electronic fallout and other non-manual order processing activities
- "Re-work Reps" - 12/97 SWBT estimates
- Minutes per day non-productive time per day and order processing times based on C&L time study
- Channel mix is based on 4Q 1997 actual mix
- Days/Month is based on SBC planning data and is adjusted for vacation time, sick time and training
- Total Service Representatives based on 12/97 actuals

1998 Manual Capacity Computations

	Formula	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
Total Service Representatives	a	550	606	606	606	672	672	672	745	745	745	745	745
ATT Dedicated Representatives	b	100	100	100	100	100	100	100	100	100	100	100	100
Other Re-work Representatives	c	40	41	42	43	44	45	46	48	49	50	51	52
Billing Dedicated Representatives													
Available Order Representatives	a-b-c=d	410	465	464	463	528	527	526	597	596	595	594	593
Minutes/day/representative	e	450	450	450	450	450	450	450	450	450	450	450	450
Non-productive time (minutes)	f	85.5	85.5	85.5	85.5	85.5	85.5	85.5	85.5	85.5	85.5	85.5	85.5
Productive minutes/day/representative	e - f = g	364.5	364.5	364.5	364.5	364.5	364.5	364.5	364.5	364.5	364.5	364.5	364.5
Total Productive minutes/day	d x g = t	149,336	169,371	168,994	168,618	192,298	191,921	191,545	217,777	217,400	217,023	216,647	216,269
Order times (in minutes)													
Residential Resale	h	5.02	5.02	5.02	5.02	5.02	5.02	5.02	5.02	5.02	5.02	5.02	5.02
Small Business Resale	i	14.77	14.77	14.77	14.77	14.77	14.77	14.77	14.77	14.77	14.77	14.77	14.77
Complex Business Resale	j	25	25	25	25	25	25	25	25	25	25	25	25
UNE	k	19.2	19.2	19.2	19.2	19.2	19.2	19.2	19.2	19.2	19.2	19.2	19.2
Channel Mix													
Residential Resale	l	54%	54%	54%	54%	54%	54%	54%	54%	54%	54%	54%	54%
Small Business Resale	m	13%	13%	13%	13%	13%	13%	13%	13%	13%	13%	13%	13%
Complex Business Resale	n	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%
UNE	o	33%	33%	33%	33%	33%	33%	33%	33%	33%	33%	33%	33%
		100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%
Weighted Average times													
Residential Resale	h x l	2.7108	2.7108	2.7108	2.7108	2.7108	2.7108	2.7108	2.7108	2.7108	2.7108	2.7108	2.7108
Small Business Resale	i x m	1.9201	1.9201	1.9201	1.9201	1.9201	1.9201	1.9201	1.9201	1.9201	1.9201	1.9201	1.9201
Complex Business Resale	j x n	0	0	0	0	0	0	0	0	0	0	0	0
UNE	k x o	6.336	6.336	6.336	6.336	6.336	6.336	6.336	6.336	6.336	6.336	6.336	6.336
Weighted Avg min/order	sum = p	10.9669	10.9669	10.9669	10.9669	10.9669	10.9669	10.9669	10.9669	10.9669	10.9669	10.9669	10.9669
Order Capacity/Day	t / p = q	13,617	15,444	15,409	15,375	17,534	17,500	17,466	19,858	19,823	19,789	19,755	19,720
Days/Month	r	18.08	18.08	18.08	18.08	18.08	18.08	18.08	18.08	18.08	18.08	18.08	18.08
Order Capacity/Month	q x r = s	246,194	279,225	278,604	277,983	317,022	316,401	315,780	359,026	358,405	357,784	357,163	356,541

Assumptions:

- ATT representatives work solely on ATT complex orders, electronic fallout and other non-manual order processing activities
- "Re-work Reps" - 1997 experience shows that 1 rep per 1,000 electronic orders must be dedicated to electronic order fallout and re-work
- Minutes per day, non-productive time per day and order processing times based on C&L time study
- Channel mix is split 67% for resale and 33% for UNE based on the 1998 line forecast from SWBT (1 UNE line = 3 orders, 1 resale line = 1 order)
- Mix within resale is based on 4Q 1997 actual data
- Days/Month is based on 1998 SBC planning data and is adjusted for vacation time, sick time and training
- Total Service Representatives based on 1998 LSC staffing plan

Manual capacity testing results (in service orders) Forecasted Capacity vs. Forecasted Demand

Manual Order Capacity vs. Forecast Volume

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Totals
Capacity	246,194	279,225	278,604	277,983	317,022	316,401	315,780	359,026	358,405	357,784	357,163	356,541	3,820,128
Forecast	113,033	112,000	110,966	109,933	108,900	107,866	106,833	105,800	104,766	103,733	102,700	101,669	1,288,200
Spare Capacity	133,161	167,225	167,638	168,050	208,122	208,535	208,947	253,226	253,639	254,051	254,463	254,873	2,531,928

Manual Order Capacity vs. 2x Forecast Volume

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Totals
Capacity	221,978	254,387	253,145	251,903	290,322	289,080	287,838	330,463	329,221	327,979	326,737	325,493	3,488,544
Forecast (2x)	226,066	224,000	221,933	219,866	217,800	215,733	213,666	211,600	209,533	207,466	205,400	203,337	2,576,400
Spare Capacity	(4,088)	30,387	31,212	32,037	72,522	73,347	74,172	118,863	119,688	120,513	121,337	122,156	912,144

Assumptions:

- At 2x forecast, capacity was reduced because re-work reps increase as electronic orders increase based on the 1/1000 ratio of re-work reps per 1,000 electronic orders

Electronic Ordering Capacity for LEX or EDI

	Orders
Volume per hour	2,094
Numbers of hours/day	10
Number of days/month	21
Volume per day	20,938
Volume per month	439,690

Section VII

Electronic systems sustainability review

**Coopers
&Lybrand**

Coopers & Lybrand L.L.P.

a professional services firm

Record of Computer Controls

Name of client

Year ended

Location

Contents

- 1 **Changes to applications**
- 2 **Computer security**
- 3 **Computer operations**

Changes to Applications	
Control Objective	What control procedures address the control objective?
<p>1.1 Change requests Requests for application program changes should be appropriately considered and processed.</p> <p><i>Consider, for example, the following points of focus:</i></p> <ul style="list-style-type: none"> • <i>What ensures that user needs result in appropriate program change requests?</i> • <i>What ensures that change requests are appropriately evaluated, authorized, prioritized, and monitored?</i> • <i>Where program changes are made in-house, what controls ensure that approved change requests are implemented on a timely basis?</i> 	
<p>1.2 Testing of program changes Program changes should be tested to ensure that they achieve the users' requirements and do not negatively impact existing processing.</p> <p><i>Consider, for example, the following points of focus:</i></p> <ul style="list-style-type: none"> • <i>Are program changes (both changes to in-house software and new releases of packages) subject to appropriate testing by IT staff and users to ensure that they will function as intended in the live environment? (Significant changes should be dealt with in the same manner as new applications.) Consider:</i> <ul style="list-style-type: none"> - <i>How management ensures that the level of testing is appropriate to the risk involved in the application change</i> • <i>What would prevent or detect unauthorized changes made after the completion of testing but before transfer to the live environment?</i> • <i>Where program changes are made in-house, what ensures that:</i> <ul style="list-style-type: none"> - <i>The source code used corresponds to the most recent version of the program?</i> - <i>Modifications to a program by more than one programmer are coordinated (e.g., through the use of program library software or manual procedures)?</i> 	

Record of Computer Controls, continued

Changes to Applications		
Control Objective	What control procedures address the control objective?	
<p>1.3 Transfer into the live environment The transfer of programs into the live environment should be appropriately controlled.</p> <p><i>Consider, for example, the following points of focus:</i></p> <ul style="list-style-type: none"> • <i>What ensures that only properly tested, reviewed, and approved changes are transferred into the live environment?</i> • <i>What ensures that the correct program libraries are updated with the most recent version of the program?</i> • <i>Where applications run at multiple sites, what ensures that all copies of live programs are updated?</i> 		
<p>1.4 Documentation and training Technical documentation should be updated to reflect program changes. When changes to applications affect user procedures, documentation should be updated accordingly. Likewise, users and IT staff should receive appropriate training when their responsibilities are impacted by application changes.</p> <p><i>Consider, for example, the following points of focus:</i></p> <ul style="list-style-type: none"> • <i>Is application documentation appropriately updated and distributed to affected users and IT staff?</i> • <i>Is technical documentation updated to reflect program changes?</i> • <i>Are users and IT staff appropriately trained?</i> 		

Record of Computer Controls, continued

Computer Security		
Control Objective	What control procedures address the control objective?	w/p ref*
<p>2.1 Security management Management should ensure the implementation of access control policies, which are based on the level of risk arising from access to programs and data.</p> <p><i>Consider, for example, the following points of focus:</i> <i>Are security requirements appropriately defined?</i> <i>Consider:</i></p> <ul style="list-style-type: none"> - Identification of data owners - Risk analysis <p><i>Are responsibilities for security administration appropriately defined?</i></p>		
<p>2.2 System level access controls Access to the computer system, programs, and data should be appropriately restricted.</p> <p><i>Consider, for example, the following points of focus:</i></p> <ul style="list-style-type: none"> • How is access restricted (e.g., security software)? • What ensures the effectiveness of system password controls (e.g., unique user-IDs, password disciplines)? • What ensures that access granted to users and IT staff is commensurate with their job responsibilities? Consider the: <ul style="list-style-type: none"> - Live environment - Test environment - Development environment • What ensures that access is appropriately changed on a timely basis when employees transfer or terminate? • What periodic checks are carried out to confirm that employees' current access is commensurate with their job responsibilities? • What ensures that users are restricted to their applications (e.g., preventing users from escaping from application menus, which are provided when they sign onto the system)? • What ensures appropriate restriction of remote access (e.g., through networks or using dial-up facilities)? • How are transmissions over networks protected? 		
<p>3.6 External network connections External network connections should be used for valid business purposes only and controls should be</p>		

Computer Security		
Control Objective	What control procedures address the control objective?	w/p ref*
<p>in place to prevent these connections from undermining system security.</p> <p><i>Consider, for example, the following points of focus:</i></p> <ul style="list-style-type: none"> • <i>To what extent has management defined the business rationale for external network connections (e.g., Internet)?</i> • <i>To what extent has management outside the IT Function supported the overall direction of the organization's use of external connections?</i> • <i>What policies and procedures are in place to ensure the connections are used for the defined purposes only (e.g. filtering to allow specific protocols only)?</i> • <i>What hardware and/or software tools are used to restrict access to appropriate uses only (e.g., firewalls)?</i> • <i>What information does management receive on use of external network connections?</i> • <i>How adequate are the tools and procedures in place to ensure that attempted and actual access violations are identified?</i> • <i>How adequate are the policies and procedures in place for handling files received across external network connections?</i> • <i>How are changes to the configuration of external network connections controlled?</i> 		

Section VIII

Testing process review

Functionality Checklist used as Criteria for Evaluating OSS Applications**1. TESTING STRATEGY****1.1. Define Scope**

- 1.1.1. Has a test strategy been prepared and documented that addresses potential defects that could result from planned business benefits not being delivered?
- 1.1.2. Does the strategy identify responsibilities for its execution, and are these responsibilities segregated from those responsible for the production of products to be tested?

1.2. Describe Progress and Performance Reporting

- 1.2.1. Does the strategy set objectives and provide for monitoring of progress and performance?

1.3. Identify Test Products and Baseline Management

- 1.3.1. Does the strategy define products of the testing phases, the controls to be applied, and the testing product baselines that must be built and placed under configuration control?

1.4. Define Steps in the Testing Development Lifecycle

- 1.4.1. Has a generally accepted systems development lifecycle model and testing approach been defined in the strategy?

1.5. Identify Required Resources

- 1.5.1. Has the strategy stated that the corresponding testing environments will be segregated in order to allow faults and problems encountered during the testing stages to be isolated and resolved?

2. COMPLETE TESTING PLANS AND MATERIAL**2.1. Complete Test Case Specifications**

- 2.1.1. Have the system test cases been reviewed for completion by a party other than those responsible for creating the cases

2.2. Define Testing Environments and Constraints

- 2.2.1. Does the testing environment allow for the testing of estimated data and transaction volumes?

2.3. Prepare Test Data

- 2.3.1. Has test data been created?
- 2.3.2. Has the test data been designed according to test criteria and system requirements?

3. PREPARE TESTING ENVIRONMENTS**3.1. Create Testing Environments**

- 3.1.1. Does the testing environment provide the procedures and computer facilities required to support testing strategies?

Functionality Checklist used as Criteria for Evaluating OSS Applications

3.2. Test and Verify Environments

- 3.2.1. Has the environment been tested to determine if it is capable of supporting the test plans proposed?

4. PERFORM UNIT TESTS

4.1. Perform Tests

- 4.1.1. Has unit testing been performed to identify errors in individual programs or modules?

4.2. Record Test Results

- 4.2.1. Were actual test results recorded against expected results?
- 4.2.2. Were results and observations recorded as the tests were performed, their status monitored, and appropriate follow up actions initiated?

4.3. Evaluate Results and Resolve Problems

- 4.3.1. Have the results of the tests been evaluated to determine any necessary changes to Requirements, Designs, or Programs?

5. PERFORM INTEGRATION TESTS

5.1. Perform Tests

- 5.1.1. Has integration testing been performed to ascertain whether new and modified program units operate together as designed?

5.2. Record Test Results

- 5.2.1. Were actual test results recorded against expected results?
- 5.2.2. Were results and observations recorded as the tests were performed, their status monitored, and appropriate follow up actions initiated?

5.3. Evaluate Results and Resolve Problems

- 5.3.1. Have the results of the tests been evaluated to determine any necessary changes to Requirements, Designs, or Programs?

6. PERFORM SYSTEM TESTS

6.1. Perform Tests

- 6.1.1. Has a system test been performed to identify "system specific" errors?

6.2. Record Test Results

- 6.2.1. Were actual test results recorded against expected results?

Functionality Checklist used as Criteria for Evaluating OSS Applications

- 6.2.2. Were results and observations recorded as the tests were performed, their status monitored, and appropriate follow up actions initiated?

6.3. Evaluate Results and Resolve Problems

- 6.3.1. Have the results of the tests been evaluated to determine any necessary changes to Requirements, Designs, or Programs?

7. TRANSFER TO PRODUCTION ENVIRONMENT

7.1. Create Environment

- 7.1.1. Does a test environment exist for user acceptance testing?

7.2. Install Software and Acceptance Test Data

- 7.2.1. Was the installed software the latest software as noted in the configuration management system?
- 7.2.2. Do procedures exist to migrate software to production?

7.3. Finalize Staffing and Procedures

- 7.3.1. Have users been prepared to participate in acceptance testing?
- 7.3.2. Have operations been prepared for their role in acceptance testing?

8. CONDUCT USER ACCEPTANCE AND PARALLEL RUNNING TESTS

8.1. Review Acceptance Test Plans and Material

- 8.1.1. Have user acceptance criteria been established and agreed upon, and are these consistent with the project definition and the testing strategy?
- 8.1.2. Do acceptance tests address the following aspects of the system:
- (a) software functionality?
 - (b) user procedures?
 - (c) security and controls?
 - (d) user documentation?
 - (e) maintenance documentation?
 - (f) operational documentation?
 - (g) contingency plans and fall back procedures?
 - (h) performance and volume handling?
 - (i) ability of system to deliver planned business benefits?

Functionality Checklist used as Criteria for Evaluating OSS Applications

8.2. Record Test Results

8.2.1. Were actual test results recorded against expected results?

8.2.2. Were results recorded as the tests are performed?

8.2.3. Were the test results reviewed?

8.3. Evaluate Results and Resolve Problems

8.3.1. Have assessments been made with the user to determine whether the testing is complete?

8.4. Perform Testing of User Procedures and Training Material

8.4.1. Have user procedures and training materials been produced?

8.4.2. Have the procedures and the materials been reviewed by the user?

8.5. Accept System

8.5.1. Does the user accept that the system meets his requirements?